

DEPARTMENT OF AGRICULTURE, MYSORE STATE.

Circular No. 10.

SMUT ON JOLA.

This disease known as the Kadige roga in the vernacular belongs to a group of diseases known as bunts, smuts or burnt ears which occur all over the world. Wheat, jola and a number of other cereals besides grasses and various other plants are subject to this disease and in some parts, treatment of seed against the smut is as regularly practised as any other farm operation such as ploughing or digging. The losses are fairly heavy and as the total yield of grain is considerably lowered in case the disease appears on the field, a general knowledge of its life history should be a valuable aid in combating it.

This disease on jola has been found to occur practically all over the northern part of the State and every year there can be seen a number of smutted heads in any field where jola is grown on a large scale. The disease appears only when the heads begin to form and as such it is practically impossible to detect it in the early stages and take steps for its destruction. When the jola heads begin to come out and mature, one will find a number of elongated white bodies here and there in the head along with sound grains or the whole head consists of these bodies only. If one of these is opened, it will be found to contain nothing but black powder and looks as if the whole grain was burnt or charred giving rise to the common name of burnt ear.

Life history of the fungus.—This black powder is nothing but the seeds or spores of a fungus which causes the disease. These get mixed up with the jola seed and germinating in water produce a short tube on which are borne the infectious seeds of the fungus. These bodies known as Sporidia germinate in moist soil containing rich decayed organic matter and infect the seedling by penetrating the delicate outer wall and grow inside the plant as the seedling grows in size. When the young seeds are about to form, the fungus produces its own seed instead, using up all the rich reserve material meant for use in the building of the jola seed. These spores or seeds black in colour are enclosed in a white membrane which occurs on the seed head. They form the starting point for infecting the next crop.

Varieties.—There are three distinct varieties of smut attacking the jola crop. In the first of these the whole head is attacked and converted into a black powdery mass. In the remaining two cases the head is formed but some or all of the grains get smutted and are replaced by the whitish elongated bodies noted above. These are known as the long smut and the short smut respectively. In the first of these cases the smutted grain is more than half an inch long and appears well over the sound grain. In the second case it is less than half an inch and projects very little above the ordinary sound grain.

Method of infection.—A few days before the harvest the whitish membrane of the smutted grains gets split across and the black spores are wafted along by the wind getting lodged in the neighbouring ears as well. Those that remain intact are burst open during the threshing operations and the whole seed gets thus contaminated. Each individual spore is microscopically small and cannot be detected on the grain. If such seed is sown in the field, the spores get the favourable conditions necessary for their germinating and infecting the young plant.

Remedial measures.—As the disease reaches the plant from the seed the most satisfactory method or combating the disease is by killing the fungus spores before the jola seed is sown. This is best done in India by steeping the seed in a solution of copper sulphate. Experiments have been carried out by the Agricultural Department and the following two methods of steeping the seed have been found very effective in preventing the disease.

1. One tola of copper sulphate is dissolved in ten seers of water (or $2\frac{1}{2}$ gallons). The seeds are soaked in the solution for 16 hours and are dried in the sun before sowing.

2. Ten tolas of copper sulphate are dissolved in ten seers of water (or $2\frac{1}{2}$ gallons). The seeds are soaked for 15 minutes and are afterwards dried before sowing.

The first treatment is much cheaper but takes a longer time. The copper sulphate should be dissolved in a wooden or earthen vessel and not in a metal one.

Conclusions.—Smut is a serious disease of jola causing at times very heavy losses.

2. The spores or seeds of the fungus become attached to the jola seed sprout along with the latter and so infect the jola plant.

3. The disease does not show itself until the heads are formed but is growing all the time within the diseased plant. It cannot therefore be detected till late in the season when nothing can be done to remedy it.

4. The best way of combating the disease is to steep the seed as directed above before it is sown.

If copper sulphate is not locally available it will be supplied by the Agricultural Department to those who wish to try the treatment, and who send a letter to that effect. If necessary an officer of the department will be sent to any locality where desired to demonstrate the method of treatment.

During the past year seed sufficient to sow about 90 acres was treated in this way by the department in various parts of Chitaldrug District and with uniformly good results.

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